

STATEMENT OF BASIS



**FIREX WATER TANK SWMU 69
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
KENNEDY SPACE CENTER
BREVARD COUNTY, FLORIDA**



PURPOSE OF STATEMENT OF BASIS

This Statement of Basis (SB) has been developed to inform and give the public an opportunity to comment on a proposed remedy to clean up contamination at the Firex Water Tank (FWT)¹. A Kennedy Space Center (KSC) Remediation Team consisting of National Aeronautics and Space Administration (NASA), United States Environmental Protection Agency (EPA), and Florida Department of Environmental Protection (FDEP) has determined that the proposed remedy is cost effective and protective of human health and the environment. However, prior to implementation of the proposed remedy, the KSC Remediation Team would like to give an opportunity for the public to comment on the proposed remedy. At any time during the public comment period, the public may comment as explained in the “How Do You Participate” section of this SB. After the end of the public comment period, the KSC Remediation Team will review all comments and issues raised in the comments and determine if there is a need to modify the proposed remedy prior to implementation.

WHY IS A REMEDY NEEDED?

The results of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) indicated that several volatile organic compounds (VOCs) listed in Table 1 are present in groundwater, which could be potentially harmful to human health if this water was used

for human consumption now or in the future. In addition, the results of the RFI indicated that arsenic and several polynuclear aromatic hydrocarbons (PAHs) listed on Table 2 are present in soil/dry sediment, which could potentially be harmful to human health.

HOW DO YOU PARTICIPATE?

The KSC Remediation Team solicits public review and comment on this SB before implementing the proposed remedy. The remedy for the FWT site will eventually be incorporated into the Hazardous and Solid Waste Amendments (HSWA) Permit for Kennedy Space Center (KSC).

<p>The Cleanup Remedy</p> <p>The proposed cleanup remedy for FWT site includes the following components:</p> <ul style="list-style-type: none"> ▪ Natural attenuation of groundwater to remove contaminants through natural processes. ▪ Monitoring of groundwater to document water quality and contaminant levels. ▪ Implementation of institutional controls to prohibit the use of groundwater as a potable water supply, prohibit residential exposure to soils/dry sediment, and to ensure the swales at the site meet the alternative soil cleanup target level assumptions.

The public comment period for this SB and proposed remedy will begin on the date of publication for notice of availability of the SB in major local newspapers of general circulation and end 45 days thereafter. If requested during the

1. In accordance with RCRA §7004(b), this Statement of Basis summarizes the proposed remedy for the NASA Firex Water Tank (FWT) site. For detailed information on the site, consult the FWT RFI Report, which is available for review at the information repository located at the NASA Document Library, North Brevard Library, 2121 South Hopkins Avenue, Titusville, FL 32780, telephone: (321) 264-5026.

comment period, the KSC Remediation Team will hold a public meeting to respond to any oral comments or questions regarding the proposed remedy. To request a hearing or provide comments, contact the following person in writing within the 45-day comment period:

Mr. Timothy J. Bahr, P.G.
FDEP - Bureau of Waste Cleanup
2600 Blair Stone Road, MS 4535
Tallahassee, FL 32399-2400

The HSWA Permit, SB, and associated administrative file, including the RFI Report, will be available to the public for viewing and copying at:

NASA Document Library
North Brevard Library
2121 South Hopkins Avenue
Titusville, FL 32780
Telephone: (321) 264-5026

To request further information, you may contact one of the following people:

Mr. Harold Williams
Remediation Program Manager
Environmental Program Office
Mail Code: TA-C3
Kennedy Space Center, FL 32899
E-mail: harold.williams-1@ksc.nasa.gov
Telephone: (321) 867-8411

Mr. Timothy R. Woolheater, P.E.
EPA Federal Facilities Branch
Waste Management Division
Sam Nunn Atlanta Federal Center
61 Forsyth Street
Atlanta, GA 30303-8960
E-mail: woolheater.tim@epamail.epa.gov
Telephone: (404) 562-8510

Mr. Timothy J. Bahr, P.G.
FDEP-Bureau of Waste Cleanup
2600 Blair Stone Road, MS 4535
Tallahassee, FL 32399-2400
E-mail: Tim.Bahr@dep.state.fl.us
Telephone: (850) 921-9984

FACILITY DESCRIPTION

NASA established the KSC as the primary launch site for the space program. These operations have involved the use of toxic and hazardous materials. Under the RCRA and applicable HSWA permit (Permit No. FL6800014585) issued by the FDEP and/or EPA, KSC was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) No. 69, the Firex Water Tank (Figure 1).

SITE DESCRIPTION AND HISTORY

The FWT site is a NASA-operated facility that includes a one-million gallon capacity steel and concrete tank, pump station including several back-up diesel generators, a 15,000 gallon diesel above ground storage tank (AST), and a 1,000-gallon waste oil underground storage tank (UST). The FWT was constructed in 1964 and moved to its current location in 1986. The pump station and other appurtenant structures were constructed in 1986. The FWT site is used to support fire suppression systems in the KSC Industrial Area.

- 1992-1993: During this time, investigations at the FWT site were focused on the soil and groundwater adjacent to an oil/water separator. The oil/water separator was abandoned in place in 1992.
- 1995: A soil sample was collected from an area of stained soil adjacent to the vent pipe for the UST. The soil sample contained petroleum hydrocarbons above regulatory criteria.
- 1996: SWMU Site Assessment activities were conducted to evaluate impacts to site soils and groundwater. Soil and groundwater samples were collected and various metals, volatile organic compounds (VOCs), and petroleum hydrocarbons were identified in site media above regulatory criteria.

- 1999: RCRA Confirmation sampling was conducted to validate previous results. Groundwater samples were collected and various metals and VOCs were identified in groundwater above regulatory criteria.
- 2000: A RCRA Facility Investigation was conducted. Samples of soil/sediment and groundwater were collected and analyzed. Results of these analyses were used to evaluate potential risks to human health and ecological receptors. The Preliminary Risk Evaluation (PRE) for human health indicated that groundwater containing VOCs, would result in an unacceptable human health risk if the groundwater was used as a source of drinking water. The ecological risk assessment (ERA) indicated that no unacceptable risk exists at the site for ecological receptors.

SUMMARY OF SITE RISK

As part of the RFI activities, risk assessments were completed in accordance with KSC's Remediation Team Risk Assessment Decision Process Document (DPD). The ecological risk assessment (ERA) was performed in accordance with the eight-step process described in the EPA's "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments", dated 1997.

Chemicals of Concern (COCs) identified for human health during the RFI included VOCs and metals in groundwater and PAHs and arsenic in soil/dry sediment (based on residential and industrial cleanup target levels). For a complete list of COCs in groundwater and soil/dry sediment see Tables 1 and 2. No COCs were identified for soil/dry sediment based on the PRE using alternate soil cleanup target levels developed for a groundskeeper. No cancer risks or non-cancer hazards were estimated for

current receptors to groundwater because of the lack of exposure pathways for any current use at the site.

The PRE showed that assuming future use of groundwater for drinking water, cancer and non-cancer risks would be unacceptable. The estimated excess lifetime cancer risk for the hypothetical future resident was determined to be 4 in a million, which is within EPA's acceptable range of 1 in a million to 1 in 10,000 but exceeds FDEP's acceptable level of 1 in a million. The main contaminant contributing to this cancer risk was vinyl chloride. The non-cancer hazard index (HI) for the future hypothetical resident was estimated to be 23, which is above the EPA and FDEP acceptable threshold of 1.0. The main contaminant contributing to the HI was aluminum. The regulatory standard for aluminum is based on secondary maximum contaminant levels.

The ERA did not identify any unacceptable ecological risks.

WHAT ARE THE REMEDY OBJECTIVES AND LEVELS?

The remedial action objective (RAO) is to limit the site to industrial uses and protect humans from exposure to groundwater by preventing its use as a drinking water source in the shallow aquifer where contaminant concentrations are higher than regulatory standards. Table 1 lists the COCs present in groundwater at the FWT site. The first column lists the chemical name, the second column lists the range of concentrations in groundwater detected at the FWT site during the RFI, and the last column presents the FDEP/EPA cleanup target level to be achieved at the site. Table 2 lists the COCs present in soil/dry sediment at the FWT site. Cleanup target levels are shown for residential, industrial, and alternative (groundskeeper) scenarios.

Table 1. Groundwater

Site-Related Chemicals of Concern (COCs)	Range of Detections ¹ (µg/L)	Site-Specific Cleanup Level ² (µg/L)
Trichloroethene	2 - 3.1	3
Vinyl chloride	1 - 3	1
Aluminum	70 - 1630	370

¹ Detections in monitoring wells

² Cleanup levels are GCTLs from Florida Administrative Code 62-777(Aluminum is KSC background value)

Table 2. Soil/Dry Sediment

Site-Related Chemicals of Concern (COCs)	Range of Detections (mg/kg)	Residential SCTL ¹	Industrial SCTL ¹	Alternative SCTL ²
Arsenic	0.42 – 4	0.8	3.7	29
Benzo(a)pyrene	0.022 - 1.24	0.1	0.5	8
Dibenzo(a,h)anthracene	0.385	0.1	0.5	16

¹ Cleanup levels are SCTLs from Florida Administrative Code 62-777

² Alternative Cleanup Target Level based on groundskeeper scenario presented in RFI Report or leachability criteria

REMEDIAL ALTERNATIVES FOR THE FWT

Because of the low levels of groundwater contamination present at the FWT site only one remedy was considered for the FWT site.

Land Use Controls and Natural Attenuation with Long-Term Monitoring: Under this alternative, natural processes such as biological degradation, dispersion, advection, and adsorption will reduce COC concentrations to cleanup levels over time. Groundwater will be

regularly sampled and analyzed to monitor and document the decrease in contaminant concentrations. Data collected during the RFI indicated that natural attenuation mechanisms will likely reduce contaminant concentrations below cleanup levels within five years. In the long term, this alternative will meet RAOs and will also allow re-evaluation to determine if the remedy is working and provide an opportunity for change if necessary. In addition, institutional controls will be implemented for site soil/ sediment and groundwater. The institutional controls will maintain the site use so that the groundskeeper scenario developed in the PRE remains applicable and will also limit the use of groundwater as a drinking water source. NASA, EPA and FDEP have entered into a Memorandum of Agreement (MOA), which outlines how institutional controls will be managed at NASA.² The MOA requires periodic inspections, condition certification, and agency notification. The area of the site that will be under institutional control is shown on Figure 2.

EVALUATION OF REMEDY

The selected remedy was evaluated to determine if it will comply with EPA's four threshold criteria for corrective measures. The four threshold criteria for corrective measures are:

- overall protection of human health and the environment;
- attain media cleanup standards;
- control the sources of releases; and
- comply with standards for management of wastes.

2. By separate MOA effective February 23, 2001, with the EPA and FDEP, KSC, on behalf of NASA, agreed to implement Center-wide, certain periodic site inspections, condition certification, and agency notification procedures designed to ensure the maintenance by Center personnel of any site-specific LUCs deemed necessary for future protection of human health and the environment. A fundamental premise underlying execution of that agreement was that through the Center's substantial good faith compliance with the procedures called for herein, reasonable assurances would be provided to EPA and FDEP as to the permanency of those remedies which included the use of specific LUCs.

Although the terms and conditions of the MOA are not specifically incorporated or made enforceable herein by reference, it is understood and agreed by NASA KSC, EPA and FDEP that the contemplated permanence of the remedy reflected herein shall be dependent upon the Center's substantial good faith compliance with the specific LUC maintenance commitments reflected herein. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy concurred in may be reconsidered and that additional measures may need to be taken to adequately ensure necessary future protection of human health and the environment.

Land Use Controls and Natural Attenuation with Long-Term Monitoring meet each of the threshold criteria and was determined by the KSC Remediation Team to be the best overall approach.

WHAT IMPACTS WOULD THE REMEDY HAVE ON THE LOCAL COMMUNITY?

There would be no impacts to the local community because groundwater is not used for potable water at KSC. The natural attenuation and long-term monitoring alternative includes administrative actions to limit the use of groundwater until the cleanup levels have been reached. In addition, the administrative actions will limit the site use so that the groundskeeper scenario remains applicable and exposure to site soils is limited.

WHY DOES THE KSC REMEDIATION TEAM RECOMMEND THIS REMEDY?

The team recommends the proposed remedy because the naturally-occurring processes

observed at the site are sufficient for the removal of low concentrations of VOCs. The long-term monitoring will be used to monitor and document reduction in contamination concentrations to the cleanup target levels. The institutional controls will also prevent exposure to contaminants prior to the cleanup levels being achieved. The proposed remedy meets the four general standards for corrective measures and was determined to be the best overall approach.

NEXT STEPS

The KSC Remediation Team will review all comments on this SB to determine if the proposed remedy needs modification prior to implementation and prior to incorporating the proposed remedy into KSC's HSWA permit. If the proposed remedy is determined to be appropriate for implementation, then a long term monitoring program will be initiated, and a Land Use Control Implementation Plan will be developed to incorporate the institutional controls at this site.

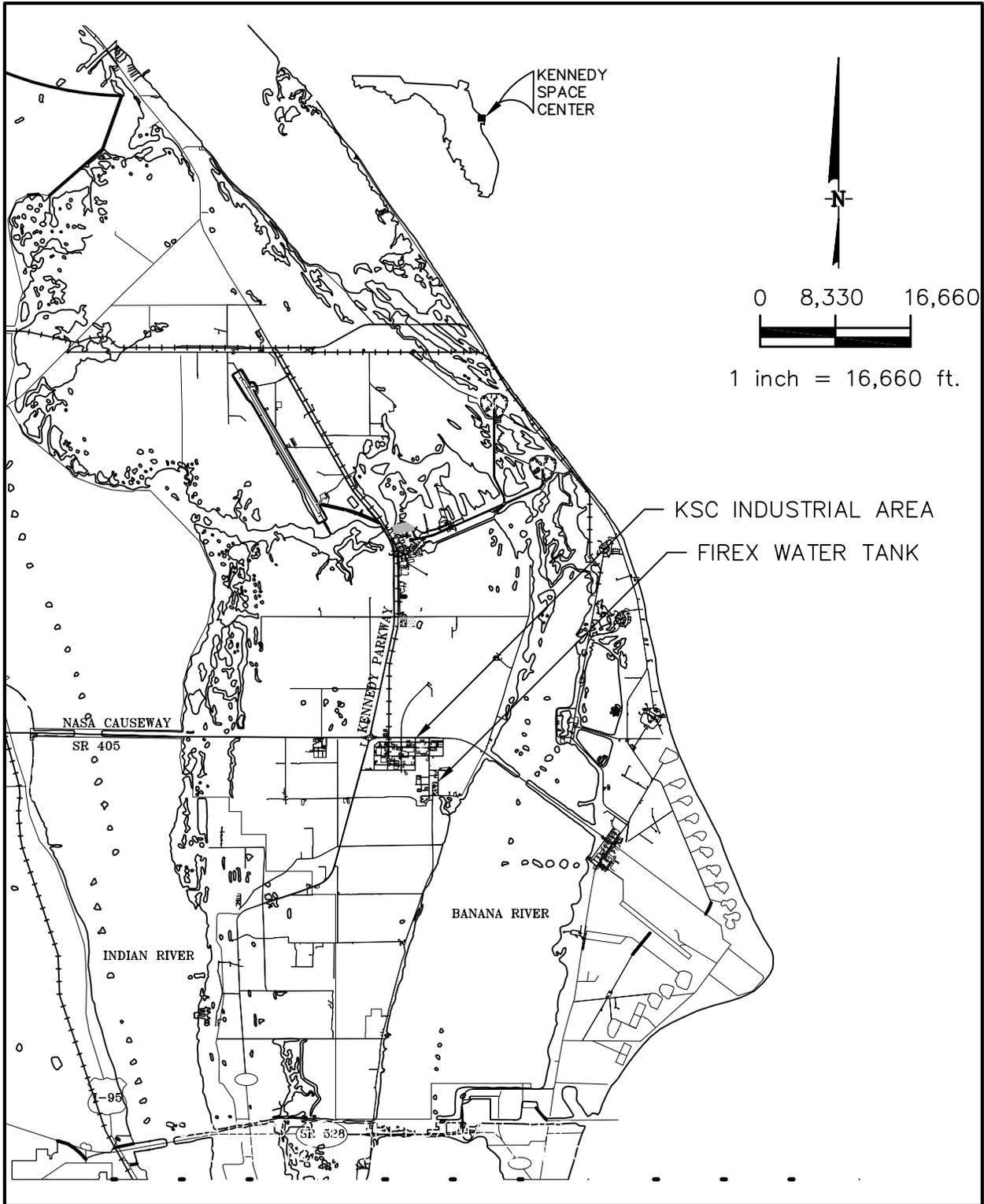
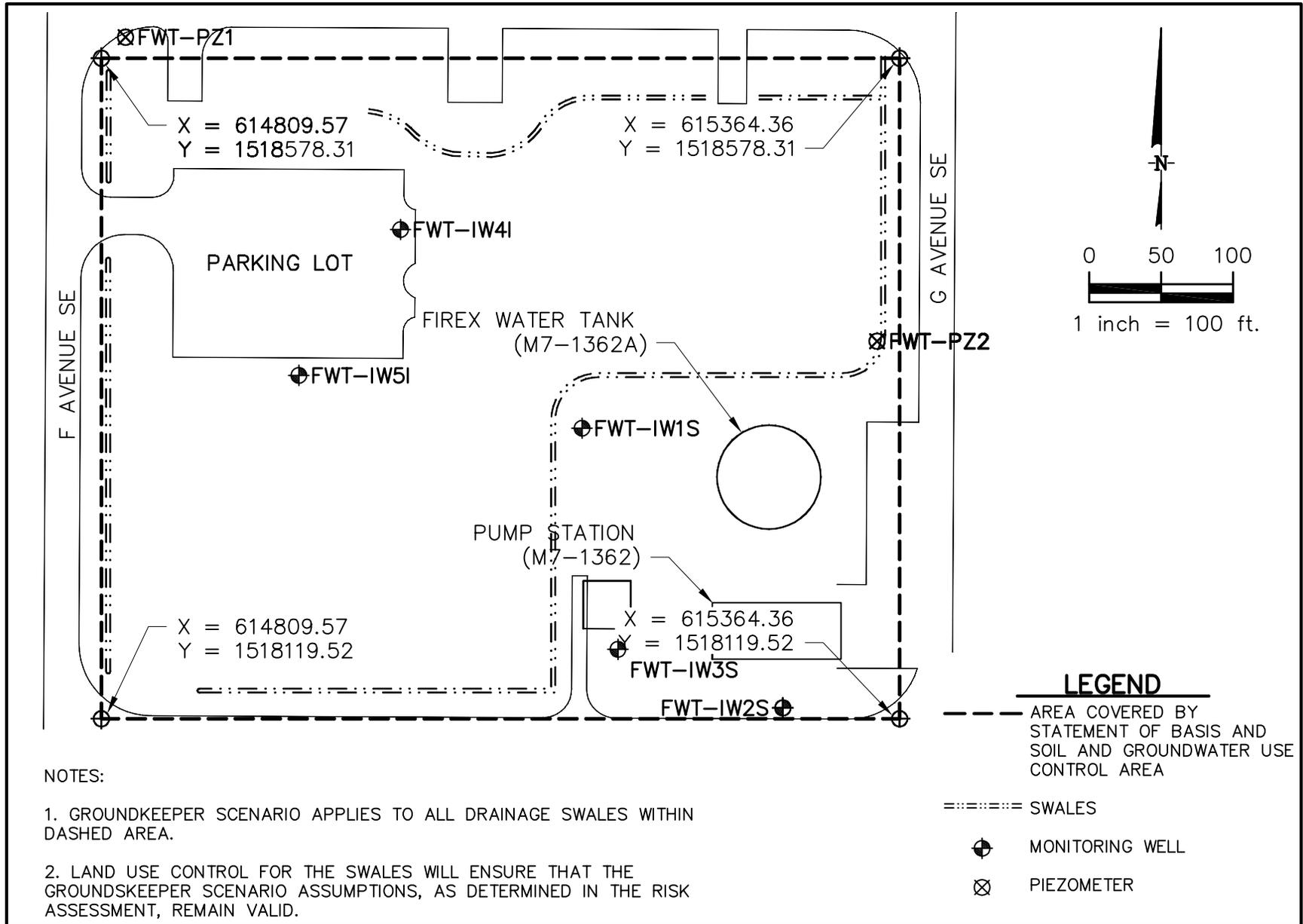


FIGURE 1
 KENNEDY SPACE CENTER
 FIREX WATER TANK SITE LOCATION MAP



**FIGURE 2
SITE MAP
FIREX WATER TANK**